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ORDERING INFORMATION
When ordering this manual use Part Number 981-0179-003.
Applies to: Engineering Part Number 950-0086-010 and up.

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General safety information for operating personnel is contained in this summary. In addition, specific WARNINGS and CAUTIONS appear throughout this manual where they apply and are not included in this summary.

Definitions

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to equipment or other property.

Symbols

⚠ : This symbol appears on the equipment and it indicates that the user should consult the manual for further detail.

V ∿ : This symbol stands for Vac. For example, 120V∿= 120 Vac

Power Source

Check the voltage selector indicator (located on the rear panel) to verify that the product is configured for the appropriate line voltage.

Grounding the Product

The product is grounded through the grounding conductor of the power cord. To avoid electric shock, plug the power cord into a properly wired and grounded receptacle only. Grounding this equipment is essential for its safe operation.

Power Cord

Use only the power cord specified for your equipment.

Servicing

To reduce risk of electric shock, do not perform any servicing other than that described in this manual.

Operation

Always wear a grounded wrist strap when operating the equipment to prevent the possibility of damage from electrostatic discharge.

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This manual contains the operational procedures specific to the UniPak 2B Programming Module; see your programmer's operation manual for programmer-specific procedures, such as program/verify operations. Included in this manual are instructions on:

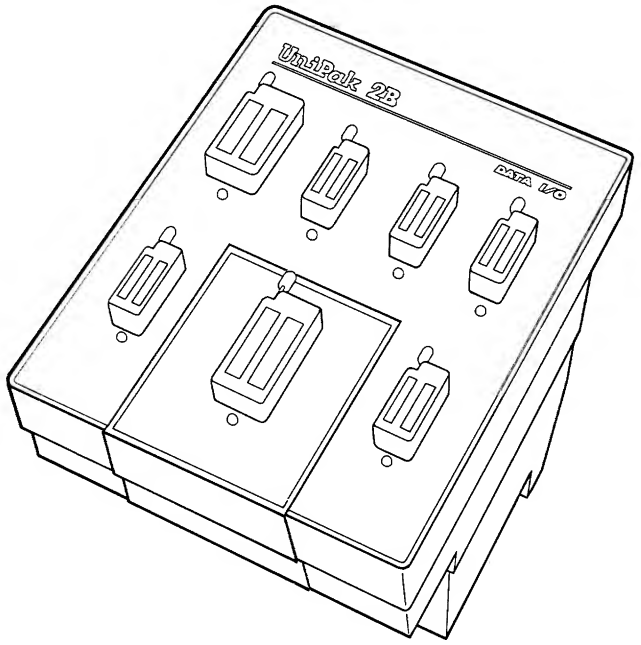
- **GETTING STARTED** — includes a sample programming session as well as instructions on device and pinout cartridge insertion and removal.
- **SELECT FUNCTIONS** — contains details on select codes, which are two-digit hexadecimal codes that enable special programmer functions that can be performed only with the UniPak 2B installed.
- **ERROR CODES** — describes the UniPak 2B's error code displays and corrective action to alleviate the problem.
- **INDEX** — provides an alphabetical guide to all major topics covered in the manual.

NOTE

The error codes provided in this manual are not accompanied by any service information. If you would like to receive maintenance data (circuit descriptions and schematics, calibration information, or waveform photographs), please contact your nearest Data I/O sales representative. (Refer to Field Applications Support subsection for list of service center numbers.)

Data I/O's UniPak 2B programs over 1100 MOS and bipolar devices. Values for programming variables, including pinouts, voltage levels and timing, are stored in firmware tables. When you choose the family and pinout codes for a particular device, the programmer uses information in these tables to assemble a specialized programming routine in scratch RAM. This method allows high-speed operation with minimum firmware overhead.

The UniPak 2B is designed to adapt to the programming requirements of many different devices; specially designed electronic switches allow programming of both bipolar and MOS devices. Pinout variations are handled by permanent device sockets on the UniPak 2B: two 16-pin, one 18-pin, two 20-pin and one 24-pin socket (see figure). One 28-pin socket resides on a pinout cartridge assembly that slides into a receptacle on the main housing of the UniPak 2B front panel.



Optional Features

The UniPak 2B includes one 28-pin cartridge as a standard item. Several optional pinout cartridges are also available, which allow programming of additional devices with unique pinouts or package styles.

CAUTION

Always hold the UniPak 2B by the chassis when carrying it. Never transport the UniPak 2B by holding onto the pinout cartridge; if it slips out while you are carrying it and the unit drops, serious damage could result.

Data I/O will continue to release pinout cartridges as new devices become available. Check the latest price list or the device list included with this manual for details on which cartridge to use for a particular device. If you wish to purchase any of these cartridges, contact your nearest Data I/O sales representative. (See Field Applications Support subsection.)

Orders made with Data I/O must contain the following information:

- Description of the equipment
- Quantity of each item ordered
- Shipping and billing address of firm, including ZIP code
- Name of person ordering equipment
- Purchase order number
- Desired method of shipment

Programmer Compatibility

To be compatible with the UniPak 2B, your programmer may require a hardware and/or firmware update, depending on the model, configuration, and age.

The information that follows will help you determine whether your programmer requires updating. If you find that your programmer does require updating, contact your nearest Data I/O Customer Support Center.

- System 17 — The System 17 must be converted into a System 19 with the latest firmware installed and latest hardware modifications.
- System 19 — Check to determine whether your System 19 contains a 702-1520 or 702-1980 controller board by performing the following steps:
  1. Remove the programming module.
  2. Remove the metal or plastic shield (if any).
  3. Count the number of EPROM firmware sockets located just behind the pak interface connector. If there are four sockets, it is a 702-1520 board; if there are eight sockets, it is a 702-1980 board.

If your System 19 contains a 702-1520 controller board, check the modification status sticker on the bottom of the programmer. If the sticker is not there or if only "1" is marked off, your System 19 requires hardware and firmware updating; contact the nearest Data I/O Customer Support Center. If "2" is marked, your system 19 is compatible with the UniPak 2B. If your System 19 contains a 702-1980 controller board, it may require a firmware update.

To display the configuration number of the firmware in your programmer, key in **SELECT B 2 START**. If the configuration number displayed is either 3599 or CC8B, your firmware needs updating.

- 29A Universal Programmer — To be compatible with the UniPak 2B, the 29A programmers must have Rev C or later firmware. To determine the configuration of the firmware in your 29A, key in **SELECT B 2 START** and observe the display. If the hex number matches one listed in the following table, your firmware needs to be updated.
- 29B Universal Programmer — The UniPak 2B is compatible with Rev A or later software (all 29Bs).
- 100A Production Programmer — To be compatible with the UniPak 2B, the 100A programmers must have Rev E or later firmware. To determine the configuration of the firmware in your 100A, key in **SELECT 10 START** and observe the display. If the hex number displayed matches one listed in the following table, your firmware needs to be updated.

Model 29A and 100A Programmers Requiring a Firmware Update

Model	Rev	Configuration Number
29A	A	1ECA
	B	20A4
29A (with computer remote control)	A	BB41
	B	C00B
100A	A	917F
	B	9405
	C	9DEE
	D	9BED

- Some devices that may be programmed by the UniPak 2B make specific demands of the programmer type, RAM size or revision level. Refer to the footnote section of the device list for these device-specific compatability requirements.

Specifications

The physical and environmental specifications are:

- Altitude: Sea level to 3000 m (10,000 ft)
- Dimensions: 25.11 x 20.0 x 12.4 cm (9.6 x 7.2 x 4.9 in.)
- Humidity (operating): 95% maximum (noncondensing)
- Temperature (operating): 5 to 45° C (41 to 113° F)
- Temperature (storage): - 40 to 70° C (- 40 to 158° F)
- Weight: 1.62 kg (3 lb 9 oz)

Warranty and Customer Support

Data I/O equipment is warranted against defects in materials and workmanship. The warranty period of one year, unless specified otherwise, begins when you receive the equipment. Refer to the warranty card inside the back cover of this manual for information on the length and conditions of the warranty. For warranty service, contact your nearest Data I/O Customer Support Center.

Data I/O maintains customer support centers throughout the world, each staffed with factory-trained technicians to provide prompt, quality service. This includes not only repairs, but also calibration of all Data I/O products.

Field Applications Support

Data I/O has field applications engineers throughout the world. They can provide additional information about interfacing Data I/O products with other systems and answer questions about your equipment. Please call one of the numbers listed below for the number of your local service center:

- In the U.S.: (800) 247-5700 (except for Washington State, call (206) 881-6444)
- Data I/O Canada: (416) 678-0761
- Data I/O Europe: 011-31-20-622-866
- Data I/O Japan: 011-81-3-432-6991
- All other locations: (206) 881-6444

Getting Started

This section of the manual describes a sample programming session with your UniPak 2B Programming Module. The procedure described is for operation with a Model 29A/B programmer; refer to your programmer manual for specific key sequences using a System 19 or 100A programmer.

Installation

Before actual programming begins, you need to install a pinout cartridge and then install the UniPak 2B into the programmer. Programming module installation is discussed in your programmer's manual. To install an optional pinout cartridge, do the following.

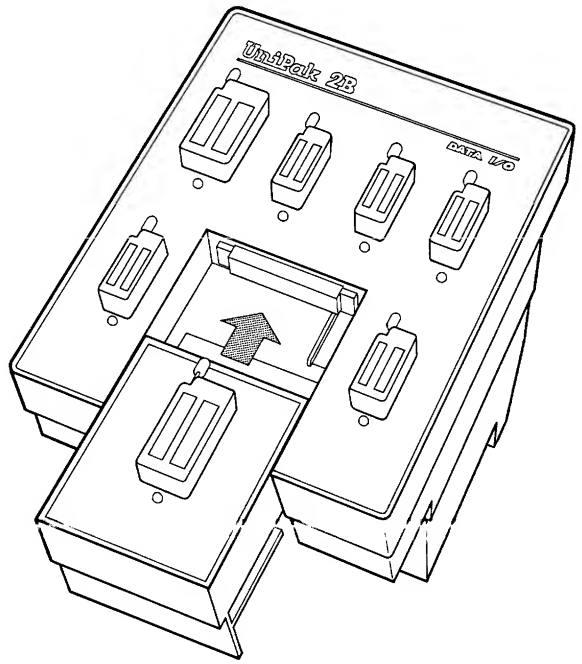
CAUTION

Always wear a grounded wrist strap when operating the equipment to prevent the possibility of damage from electrostatic discharge.

1. Slide the cartridge along the guides and into the UniPak 2B's receptacle (see figure).
2. Press the cartridge into the connector until it locks in place.

CAUTION

Always hold the UniPak 2B by the chassis when carrying it. Never transport the UniPak 2B by holding onto the pinout cartridge; if it slips out while you are carrying it and the unit drops, serious damage could result.



Programming

The following steps describe how to program a 2764 part using a master device (a part that has been previously programmed and is used as a "master" to program other parts). This procedure assumes that the UniPak 2B is installed in the programmer. For more details on device programming, see your programmer's manual.

CAUTION

Do not remove or install a pinout cartridge with the programmer's power on. If RAM data must be saved, remove the UniPak 2B from the programmer, change the pinout cartridge and then reinstall the UniPak 2B in the programmer

CAUTION

Do not operate the UniPak 2B without a pinout cartridge installed. Accidentally touching the exposed connector pins with a metal object, such as a screwdriver, could short out the unit.

1. Make sure all the device sockets are empty.
2. Power-up the programmer.
3. Press **COPY DEVICE RAM START** to prepare the programmer to transfer the master device data to the programmer's data RAM. The programmer will display
   `FAM^00 PIN 00.` or `FAM ^ 000 PIN 000`, if it is a 29B, V06 or later.
4. Press **7 9 3 3**, the family/pinout code for the 2764 part, if the display is `FAM ^ 00 PIN 00.` The programmer will then display
   `FAM 79 PIN ^ 33.`

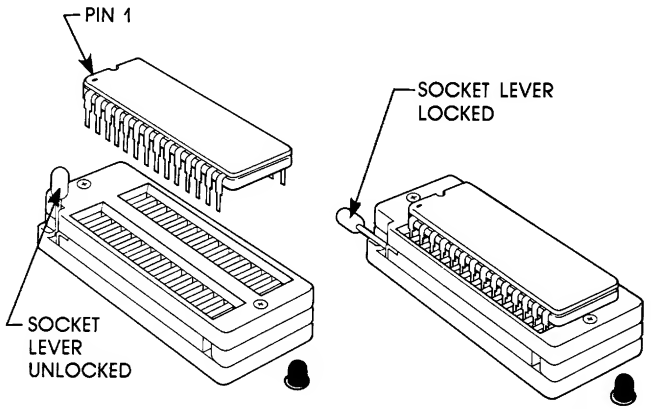
   Press **079033**, the family/pinout code if the display is `FAM ^ 000 PIN 000.` The programmer will then display
   `FAM 079 PIN ^ 033.`

CAUTION

If the base machine displays a 3 digit family code and a 3 digit pinout code, a leading 0 must be entered for the family code and pinout code unless the device list specifies a 3 digit code.

5. Lift up the lever on the socket that has an illuminated LED below it (see figure). Line up pin 1 of the device so that it is nearest the lever and set the device into the socket. Press down on the lever to lock the device in place.

   NOTE: Orient PLCC devices according to the drawing to the left of the PLCC socket.



6. Press **START**. The programmer will display

   `LOADING DEVICE ⊗`
   `LOAD DONE XXXX` or
   `LOAD DONE XXXXXX`
   depending on base machine version.

7. Lift up the socket lever and remove the master device from the socket. The master device data is now transferred to RAM. The next part of the procedure transfers that data to the blank device.
8. Press **COPY RAM DEVICE START** to prepare the programmer to transfer the data to the blank device. The programmer will display

   `FAM^79 PIN 33.` or `FAM ^ 079 PIN 033`, if it is a 29B, V06 or later.

9. Lift up the lever on the socket that has an illuminated LED below it (see figure). Line up pin 1 of the blank device so that it is nearest the lever and set the device into the socket. Press down on the lever to lock the device in place.

10. Press **START**. The programmer will display

```
TEST DEVICE          ⊗
PROGRAM DEVICE       ⊗
VERIFY DEVICE        ⊗
PRG DONE 01 XXXX
```

or

`PRG DONE 01 XXXXXX` depending on base machine version.

NOTE

"XXXX" or "XXXXXX" is the device's sumcheck; the hexadecimal sum of all the bytes in the device. The number displayed should match the sumcheck displayed during step 6 of this procedure.

11. Lift up the socket lever and remove the device from the socket. The device is now programmed.

Select Functions

The UniPak 2B offers special functions that are accessed by keying in two digit hexadecimal codes. These functions are not required for normal operation of the UniPak 2B. After you have keyed in a code and pressed **START**, the programmer signals that the operation is complete by displaying two asterisks (**) in the last two display positions.

Eight select functions are specific to the UniPak 2B. The table below lists these codes and gives a brief description of each. The following pages contain the procedures to access each of these special functions.

Code	Description
BC	Disables the electronic identifier function.
BD	Enables the electronic identifier function, which allows programming without having to key in the family/pinout code each time.
C3	Displays additional programming capabilities available with some devices the UniPak 2B programs.
CC	Displays the family and pinout code of the last device data moved to the programmer's RAM.
CD	Displays the device's electronic identifier, a binary code that contains information on manufacturing code and device code.
CE	Sets to one the number of programming pulses applied to each byte of the device to be programmed.
CF	Sets the number of programming pulses applied to each byte at the manufacturer's specified number.
EF	Displays the revision level and version number of the UniPak 2B's firmware. These numbers are used when identifying equipment over the phone to Data I/O technical support personnel.

NOTE: The key sequences shown here are for operation using a Model 29 A/B programmer; see your programmer manual for procedures specific to your programmer.

Codes BC and BD — Disable/Enable Electronic Identifier

Functions BC and BD are used to disable and enable the electronic identifier function. You may use the electronic identifier feature in two ways. The first use of the identifier is to prevent accidentally damaging a device by keying in the wrong family and pinout code. When a family and pinout code is first keyed in, the programmer reads the electronic identifier. If the device has an electronic identifier corresponding to a family pinout code other than the one keyed in, the programmer will signal an error.

The electronic identifier is also used to allow programming without having to key in the family pinout code each time. When the programmer prompts you for the family and pinout code, key in **F F F F** or **OFF OFF** if the base machine displays 3 digit family/pinout codes. The programmer will then automatically read the identifier and use the correct algorithm to program the device.

NOTE

Not all devices have the electronic identifier feature; check the device data sheet for details.

To disable the electronic identifier (BC), follow the procedure below.

1. Press **SELECT**; Model 29B displays `SELECT CODE ^`.
2. Press **B C START**; Model 29B displays `DISABL SIL SIG **`.

   When in computer remote control (CRC) mode, send **B C] RETURN**; the response will be `DISABL SIL SIG>`.

To enable the electronic identifier (BD), follow the procedure below.

1. Press **SELECT**; Model 29B displays `SELECT CODE ^`.
2. Press **B D START**; Model 29B displays `ENABLE SIL SIG **`.

   When in computer remote control (CRC) mode, send **B D] RETURN**; the response will be `ENABLE SIL SIG>`.

Code C3 — Access Special Programming Options

Some devices have additional programming capabilities, such as security fuse programming. Select code C3 gives access to these options. See the device data sheet for details on what programming options are available with the device(s) you are using. The device list included with this manual contains option flowcharts for use in accessing complex device options.

NOTE

If the UniPak 2B is being used in a Model 19, this select code will work only from terminal remote.

To display the programming options, follow the procedure below.

1. Press **SELECT**; Model 29B displays `SELECT CODE ^`.
2. Press **C 3 START** (or in CRC mode, send **C 3] RETURN**) ;
   Model 29B displays `FXX PYY OPTIONS` or `FXXX PYYY OPTS`, if it is a 29B, V06 or later.
3. Press **START** (or in CRC mode, send **RETURN**); Model 29B will display the first option.

NOTE

For the 8751H and 9761 devices, the option "PROG SECTY ONLY" will program the security fuse as soon as the option is selected and executed.

4. To scroll through the available options, press **REVIEW**. When the option you want (such as program security fuse) appears in the display, press **START.** In terminal remote, the **RETURN** key is used for the **START** key, and the space bar is used for the **REVIEW** key.
5. If the option has subheadings under it, press **START** and then use the **REVIEW** key to scroll through the subheadings. Again, press **START** when the option you want appears in the programmer's display. Once an option has been selected, an asterisk will be displayed after the option name. Complete execution may require performing the functions listed in a number of subheadings. Pressing **START** a second time after an option is selected will exit the options file and the Model 29B will display `OPTIONS DONE ** .`

Code CC — Display Last Family and Pinout Code Used

Select code CC displays the last family and pinout code used, generally the last device programmed or read. This function helps determine the family and pinout codes used by the programmer when in the automatic electronic identifier mode.

To display the family and pinout codes of the last algorithm moved to RAM, follow the procedure below.

1. Press **SELECT**; Model 29B displays `SELECT CODE ^ .`
2. Press **C C START**; Model 29B displays `FXX PYY **` or `FXXX PYYY **`, if it is a 29B V06 or later.
3. In computer remote control (CRC) mode, press **C C] RETURN**; response will be `XXYY>`, or `XXXYYY>` if it is a 29B V06 or later.

NOTE

XX/XXX represents the family code; YY/YYY represents the pinout code.

Code CD — Display Electronic Identifier

Function CD displays in hexadecimal 16 bytes or words, if it is a 16 bit device, of the device's electronic identifier. Byte or word 0 identifies the manufacturer; byte or word 1 identifies the device. For information on the purpose of the remaining bytes, consult the device data sheets.

To display the electronic identifier, proceed as follows:

1. Press **SELECT**; Model 29B displays `SELECT CODE ^`
2. Press **C D START**; Model 29B displays `SELECT CODE ^ CD`
3. Press **START** and the model 29B displays `0000 YY` or `0000 YYYY` if it is a 16 bit device.
4. To display additional bytes of the electronic identifier, press **START**; Model 29B displays `XOOOX YY` or `000X YYYY`.

To back up through previously displayed identifiers, press **REVIEW**; Model 29B displays `OOOX YY` or `OOOX YYYY`.

NOTE

000X represents the byte or word number of the identifier displayed (i.e., 0001 represents byte or word 1 of the electronic identifier, which is the device code). YY or YYYY represents the identifier byte in hexadecimal.

5. In CRC mode, send **C D] RETURN**; the response will be all 16 bytes or words at once:

```
YY YY YY YY YY YY YY YY YY YY YY YY YY YY YY YY
```

or

```
YYYY YYYY YYYY YYYY YYYY YYYY YYYY YYYY
YYYY YYYY YYYY YYYY YYYY YYYY YYYY YYYY
```

Codes CE and CF — Set Reject Count

Functions CE and CF are used to set the reject count (the number of programming pulses applied to a fuse or cell before it is rejected). Select code CE sets the reject count back to the commercial specification (this is the default value) and CF sets a single-pulse reject count.

To select the commercial (default) reject count (CE), follow the procedure below.

1. Press **SELECT**; Model 29B displays `SELECT CODE ^ .`
2. Press **C E START**; Model 29B displays `COM REJECT LIM** .`
   In CRC mode, send **C E] RETURN**; the response will be `COM REJECT LIM >.`

To select the single-pulse reject count (CF), take the following steps:

1. Press **SELECT**; Model 29B displays `SELECT CODE ^`
2. Press **C F START**; Model 29B displays `ONE PULSE RJCT**.`
   In CRC mode, send **C E] RETURN**; the response will be `ONE PULSE RJCT>.`

Code EF — Display Configuration Information

Function EF calls up a four-digit hexadecimal configuration number and a two-digit decimal version number that correspond to the revision level and version number of the UniPak 2B firmware. These numbers are used when identifying equipment over the phone to Data I/O technical support personnel.

To display the UniPak 2B firmware configuration and version number, do the following:

1. Press **SELECT**; Model 29B displays `SELECT CODE V.`
2. Press **E F START**; Model 29B displays `XXXX VER YY.Y**.`

NOTE

XXXX represents the UniPak 2B firmware configuration number, and YY.Y represents the version number.

3. In CRC mode, send **E F] RETURN**; the response will be `XXXX VER YY.Y>`

Error Codes

NOTE

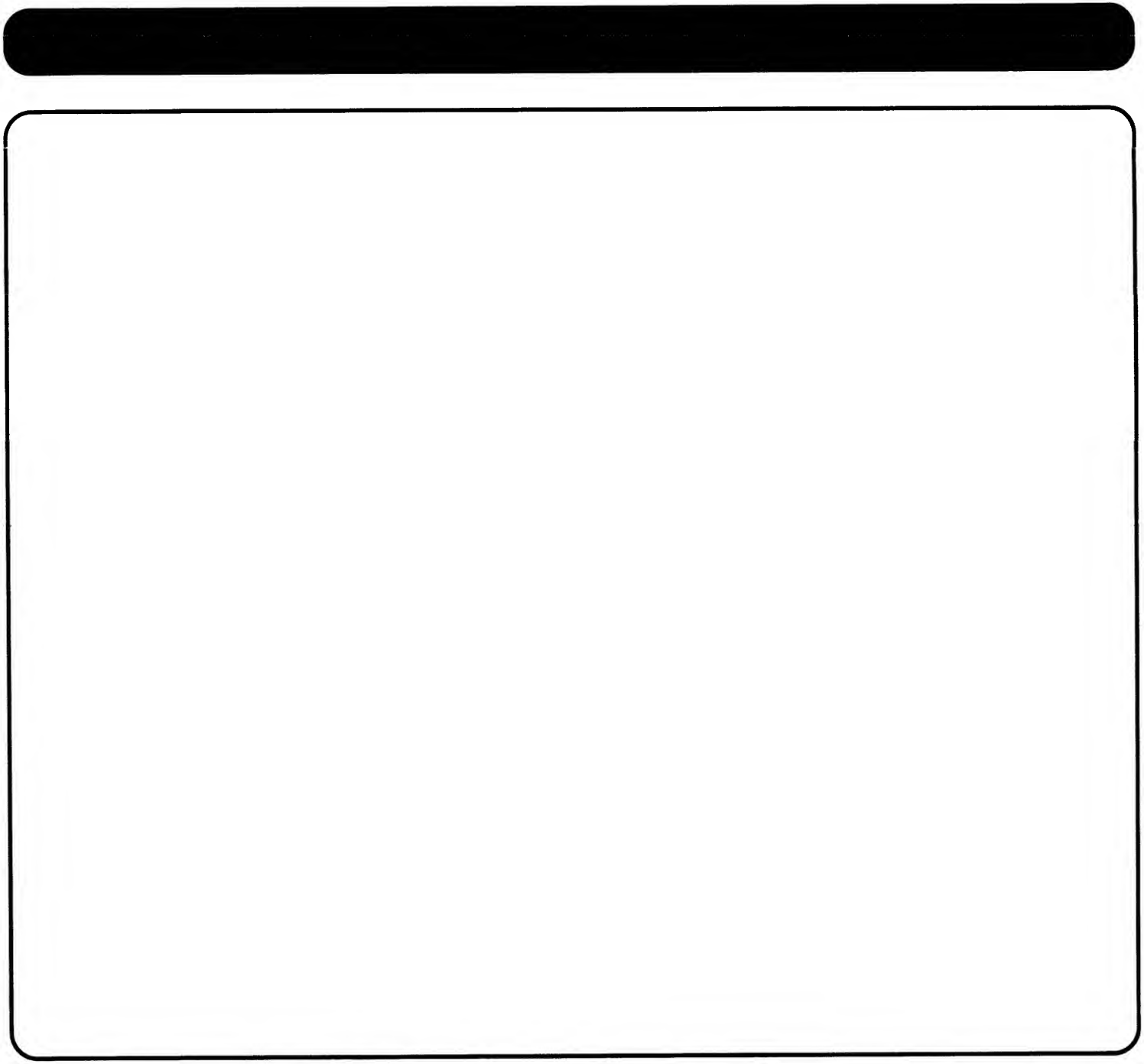
In the case of an error condition, be sure that the family and pinout codes are correct for the device installed; refer to the device list to cross-check family and pinout codes. If you get a recurring error, call your local customer support center.

Code	Name	Description
20	Non Blank	The device you are attempting to program contains already-programmed locations. You can program over these locations by pressing **START.**
21	Illegal-Bit Error	The device cannot be programmed due to already programmed locations of incorrect polarity.
23	First-Pass Verify Error	The device data was incorrect on the first pass of the automatic verify sequence during device programming.
24	Second-Pass Verify Error	The device data was incorrect on the second pass of the automatic verify sequence during device programming.
27	Insufficient RAM	Due to the value of the Begin RAM Address, there is insufficient RAM to program the device, or the total allotment of RAM resident is less than the word limit of the device.
30	No Programming Algorithm	Valid family and pinout codes are not selected, or family code selection is not followed by pinout code selection.
31	Excessive Current Drain	The operation aborted due to excessive current drain by a device.

Error Codes

Code	Name	Description
32	Backward Device	The operation aborted due to VCC level test indicating a backward device.
35	Faulty Chip Select	The operation aborted due to data being present while a device is disabled.
37	Socketing Error	Operation aborted due to a low VCC level indication on sockets presumed to be empty. A device may be in the wrong socket, or two or more devices may be socketed simultaneously.
38	Bad Calibration Number	An illegal calibration step was attempted during calibration.
39	Failure to Lock Security Fuse	The security bit did not program and the device is not locked.
70	Faulty Bit Supply	The operation aborted due to a faulty BIT supply. Do not use UniPak 2B until repaired.
71	Faulty CS Supply	The operation aborted due to a faulty CS supply. Do not use UniPak 2B until repaired.
72	Faulty VCC Supply	The operation aborted due to a faulty VCC. Do not use UniPak 2B until repaired.
A1	No Identifier Found	The device does not have an electronic identifier. The electronic identifier mode cannot be used.
A2	Invalid Identifier	The electronic identifier of the device has been read and it indicates that the device cannot be programmed using the selected family and pinout codes. Consult the device table for the correct family and pinout codes. Try the operation again using these codes.

Code	Name	Description
B0	Byte Erase Error	The device does not have a byte erase mode. Block limits must be removed and a chip erase performed. The entire chip may then be reprogrammed.
B1	Chip Erase Error	The device does not have a chip erase mode.
B3	Wrong Pinout Cartridge	The wrong pinout cartridge is inserted in the UniPak 2B. Check the device list to make sure you are using the correct cartridge.
B5	Invalid Pinout	This pinout will not work with this base machine configuration.
B7	No Pinout Cartridge	There is no pinout cartridge installed in the UniPak 2B. Install the cartridge.



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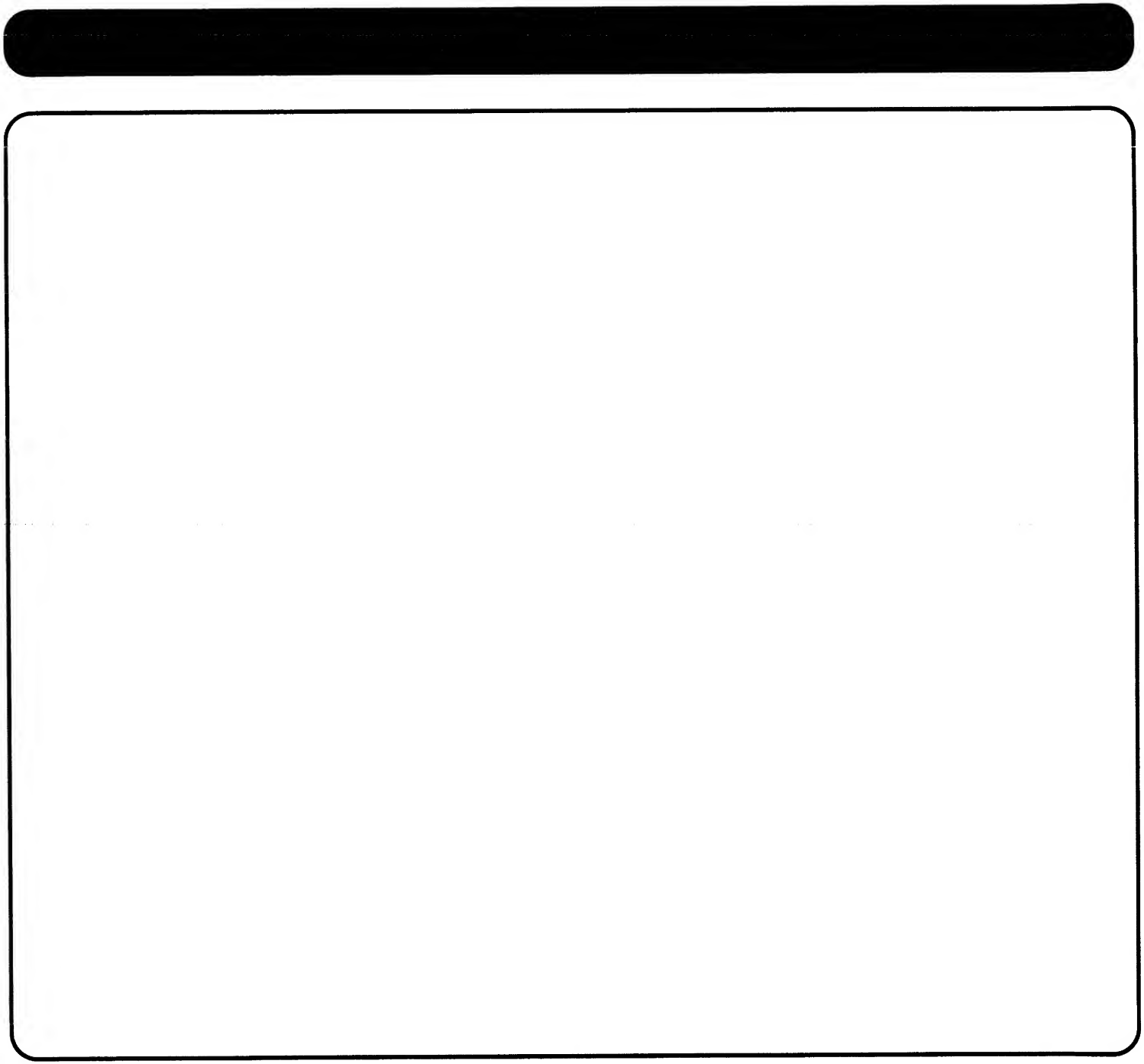
** Check the device list included with this manual*



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